

CORROSION CONTROL

Treatment Processes in N.H.
Water Systems

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USEPA LEAD & COPPER RULE

- ▶ In New Hampshire:
- ▶ 711 Community Water Systems
- ▶ 470 Non-transient, non-community Water Systems
- ▶ 1,181 Total Water Systems subject to LCR

LCR Compliance in N.H.

- ▶ 377 water systems (about 31%) with some type of corrosion control treatment
- ▶ **804 water systems meet or are below Lead and Copper Action Levels**
- ▶ Corrosion control is required when the 90th percentile level of tap water exceeds the action level (AL) established of 0.015 mg/L for lead (Pb) or of 1.3 mg/L for copper (Cu)

TREATMENT GOALS

- * pH above 7.0

(Hydrogen ion activity)

- * Alkalinity of 40-50 mg/L

(Neutralizing acid)

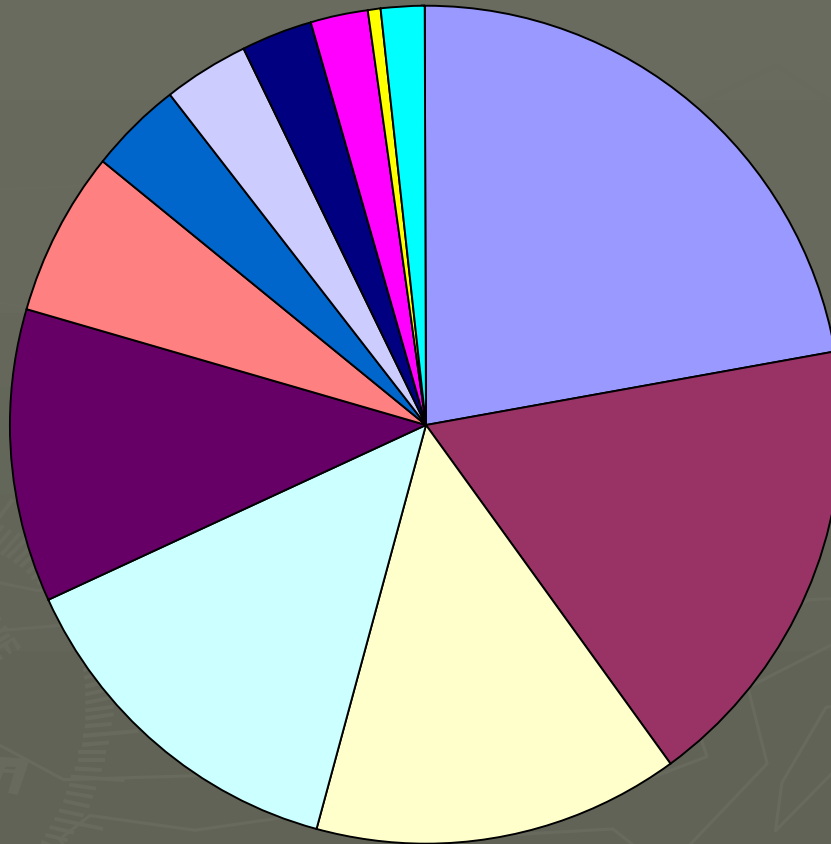
- * Film (or scale) formation

- * Acceptable Water Chemistry

Treatments Used in N.H.

Corrosion Control Treatment Type	Number in use in New Hampshire
CALCITE FILTER	82
CAUSTIC SODA (sodium hydroxide)	65
SODA ASH (sodium carbonate)	52
POLYPHOSPHATES	51
ORTHOPHOSPHATES	42
POTASH (potassium carbonate)	23
BAKING SODA (sodium bicarbonate)	13
AERATION	13
POTASSIUM HYDROXIDE	10
LIME	8
SILICATES	2
OTHER	6

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- SILICATES
- OTHER

CALCITE FILTER

Calcium hardness adjustment

Calcium carbonate precipitation forms film

- ▶ Type of media
- ▶ Flow, contact time
- ▶ Control and consistency challenging

CAUSTIC SODA

- ❖ Liquid, sodium hydroxide
- ❖ Raises pH
- ❖ Alkalinity effect negligible
- ❖ Handling problem- amount needs exact control
- ❖ Hazardous material
- ❖ (Potassium hydroxide solution)

PHOSPHATES

- ▶ Orthophosphate with different formulas: zinc orthophosphate, potassium or sodium orthophosphate (phosphoric acid)
- ▶ Protective film
- ▶ Baseline pH
- ▶ Continuous dosage level, consistency
- ▶ Poly/Orthophosphate blends
- ▶ Reversion

SODA ASH

- ❖ Raises pH
- ❖ Raises alkalinity
- ❖ Good choice with limited technical resources
- ❖ Safe to handle

POTASH

- ❖ Potassium Carbonate
- ❖ Raises alkalinity
- ❖ Raises pH (smaller effect on pH)
- ❖ Safe to handle
- ❖ 8 times more soluble than soda ash

BAKING SODA

- ▶ Sodium Bicarbonate
- ▶ Raises alkalinity
- ▶ Raises pH (smaller effect on pH)
- ▶ Powder to dissolve
- ▶ Very safe to handle

KOH

- ❖ Potassium Hydroxide
- ❖ Raises pH
- ❖ Good solubility
- ❖ Handling problem – amount needs exact control
- ❖ Hazardous material

AERATION

- ❖ Very suitable for water with high carbon dioxide
- ❖ Raises pH
- ❖ Reduces DIC
- ❖ Oxidize and precipitate iron and manganese
- ❖ Strip out radon, hydrogen sulfide and odor causing organics and volatile organic chemicals

LIME

- ▶ Goal- raise pH, raise alkalinity
- ▶ Dense hydrated lime (with 50% sodium hydroxide) the strongest pH adjustment
- ▶ Problems mixing with other chemicals
- ▶ Minimal solubility
- ▶ Hazardous material

SILICATES

- ❖ Goal – silicate residual (coats pipes)
- ❖ Goal – raising pH
- ❖ Flow pacing
- ❖ Frequent monitoring
- ❖ Usually liquid

Fixture and Plumbing Replacement



- ▶ Appropriate for some small systems
- ▶ In lieu of treatment
- ▶ With follow-up monitoring

Other Treatments

❖ CO₂

❖ Blending sources

❖ Point-of-use systems

EVALUATION OF TREATMENT

- ▶ For corrosion control
- ▶ Potential secondary impacts
- ▶ Operational demands
- ▶ **CO\$T**

Optimizing Treatment

- ❖ Day/mixing tanks filled
- ❖ Chemical liquid/dissolved properly
- ❖ Chemical pump
- ❖ React to water quality changes

WATER QUALITY

- ❖ pH and temperature, field conditions
- ❖ Alkalinity
- ❖ Conductivity
- ❖ Calcium levels
- ❖ *Orthophosphate concentrations*
- ❖ *Silicate concentrations*

Optimizing Water Quality

- ❖ Sample throughout distribution system
- ❖ Field test pH at true temperature
- ❖ Take system evaluation (“non-compliance”) lead & copper samples if needed
- ❖ Wait to take compliance lead & copper until treatment is working efficiently

Water Quality Changes

- ▶ New wells
- ▶ New chemical supply source
- ▶ Addition of other treatment processes
- ▶ Chemical storage issues

QUESTIONS?

For assistance with corrosion control:
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For Lead and Copper Rule sampling and
compliance:
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